

Stock Index Futures, Expiration Day Volatility, and the “Special” Friday Opening: A Note

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The cash settlement feature of the Standard & Poor's (S&P) 500 futures and S&P 100 options requires that arbitrage positions be unwound or rolled over immediately prior to expiration. This has led to concerns that index futures and index options have a destabilizing effect on equity prices during the last hour (i.e., the “triple witching” hour) of trading on days on which the S&P 500 futures, S&P 100 options, and options on individual stocks expire simultaneously. Prior to June, 1987, this occurred on the third Friday of March, June, September, and December. The decision by the Chicago Mercantile Exchange in 1987 to alter settlement procedures for the S&P 500 futures was a direct result of these concerns.

Beginning with the June 1987 S&P 500 futures contract, the last trade day was moved from Friday to the Thursday preceding the third Friday of the contract month with final settlement based on a “special” Friday opening for the underlying index. Expiration procedures for the S&P 100 options were not altered and remain the close of trading on the third Friday of the contract month. Today expiration is no longer synchronized between the S&P 500 futures and S&P 100 options.

Expiration procedures were altered in an attempt to reduce spot expiration day volatility (i.e., in particular triple witching hour volatility). Volatility is measured by the standard deviation of returns. Has this change been effective? This note investigates that question.¹

I. DATA

Thursday's closing and Friday's hourly (11:00, 12:00, 13:00, 14:00, 15:00, and 16:00 (Friday's close)) prices for the S&P 500 index were obtained from S&P Corporation for the 22 quarterly expirations over the period June, 1984 through September, 1989. All prices were based on Eastern Standard Time. Twelve expirations (June, 1984 through March, 1987) were classified as “old” with ten expirations (June, 1987 through September, 1989) as “new.” Returns were calculated from Thursday's close to Friday's 11:00 index price (“first” hour return), and thereafter on an hourly basis.

¹Expiration day refers to the third Friday of March, June, September, and December.

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II. EMPIRICAL RESULTS

The empirical results are presented in Table I and in Figure 1. Triple witching hour (15:00 to 16:00) volatility associated with the new settlement procedures is significantly less ($F = 9.32$, $p\text{-value} < .01$) than that recorded for the old procedures. In contrast, first hour volatility is significantly greater ($F = 8.87$, $p\text{-value} < .01$). The observed decrease in triple witching hour volatility associated with the new settlement procedures coincides with an approximately equal increase in first hour volatility.

The new settlement procedures have been successful in significantly reducing triple witching hour volatility. However, this has occurred at the expense of a significant increase in first hour volatility. Volatility has been shifted within the day. On a close-to-

Table I
EXPIRATION DAY VOLATILITY FOR THE S&P 500 INDEX:
JUNE, 1984 THROUGH MARCH, 1987 VS. JUNE, 1987 THROUGH SEPTEMBER, 1989

	Thursday's Close : : : 11:00 E.S.T.	11:00 : : 12:00	12:00 : : 13:00	13:00 : : 14:00	14:00 : : 15:00	15:00 : : 16:00	Thursday's Close : : : Friday's Close
A. Old Procedure (June, 1984 through March, 1987)							
Std. Dev.	0.2906	0.1712	0.1805	0.1451	0.2275	0.9230	1.1328
B. New Procedure (June, 1987 through September, 1989)							
Std. Dev.	0.8646	0.1702	0.2101	0.1466	0.3058	0.3024	1.1744
F-statistic	8.87*	1.00	1.35	1.02	1.80	9.32*	1.06

The F -statistic is testing the hypothesis of equal variances.

*Significant at the .01 level.

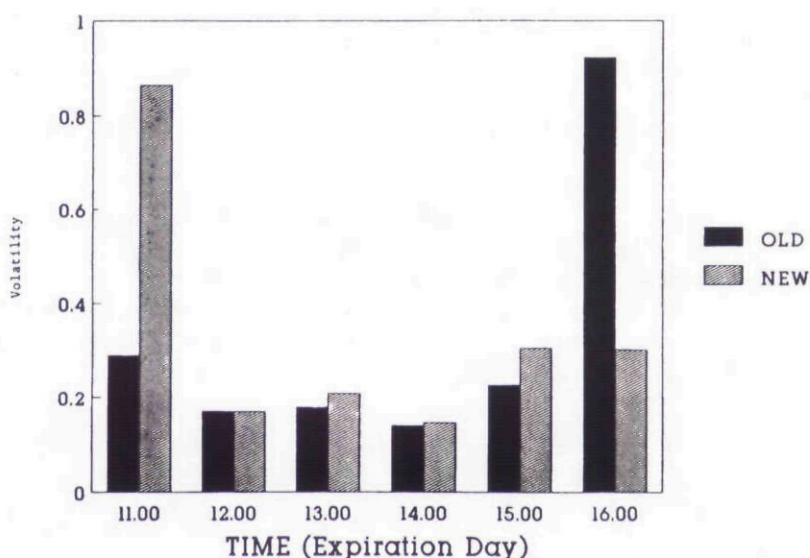


Figure 1
Intraday Volatility For The S&P 500 Index

close basis there exists no significant difference in volatility between settlement procedures. No significant difference in hourly volatility (11:00 to 12:00, 12:00 to 13:00, 13:00 to 14:00, and 14:00 to 15:00) is found between settlement procedures. These results are graphically depicted in Figure 1.

III. CONCLUSION

On a close-to-close basis, no substantive change in volatility has occurred due to the change in settle procedures. However, triple witching hour volatility has been significantly reduced.

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